



Cytology Services Utilisation Pattern in North-Central Nigeria

Raymond Akpobome Vhritherhire^{1*}, Joseph Aondowase Orkuma¹,
Joseph Aondowase Ngbea¹, Barnabas Agaba Eke¹,
Godwin T. A. Jombo¹ and Amali Adekwo²

¹Department of Anatomical Pathology, College of Health Sciences, Benue State University, Makurdi, Nigeria.

²Department of Human Physiology, University of Jos, Jos, Plateau State, Nigeria.

Authors' contributions

This work was carried out in collaboration between all authors. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/BJMMR/2016/29774

Editor(s):

(1) Umit Bagriacik, Department of Immunology, Gazi University, Turkey.

Reviewers:

(1) Jorge Paredes Vieyra, Universidad Autonoma De Baja, California, USA.

(2) Sandra Aparecida Marinho, Universidade Estadual da Paraíba, Brazil.

Complete Peer review History: <http://www.sciencedomain.org/review-history/17011>

Original Research Article

Received 28th September 2016
Accepted 27th October 2016
Published 24th November 2016

ABSTRACT

Context: Cytology is a simple, fast, low cost, minimally invasive and sensitive technique for evaluating cells sampled from lesions in the body. It is an aspect of pathology service at its fledgling stage in most institutions in sub-Saharan African countries.

Aims: This study examined the pattern of the cytology samples received in the laboratory of a relatively new tertiary hospital in north-central Nigeria.

Materials and Methods: Three years archival slides and records of cytology samples were retrieved and analysed.

Results: Cytology specimens were 775 (27.5%) of 2,823 samples accessioned during the period. Most of the samples were cervical smears constituting 436 (56.3%) and an annual rate of 218 samples per year. This was followed by 134 (17.3%) breast fine needle aspiration (FNA) with an annual rate of 67 samples per year. The 48 (6.2%) lymph nodes FNA samples had an annual rate of 24 samples per year. Soft tissue and thyroid masses were 40 (5.2%) and 37 (4.8%),

*Corresponding author: E-mail: akp4ray@yahoo.com;

respectively. The sites of other less commonly requested cytology samples in this study included the liver, nose, eyes, testes, urine and peritoneal fluids. The patients' age ranged from 14 months to 80 years.

Conclusions: This study shows a still very low utilisation of cytology services in management of patients. There remains the need of developing diagnostic cytology services in Nigeria, taking advantage of its low cost, accuracy and timeliness as a simple, yet highly useful diagnostic tool in a resource deficient environment.

Keywords: Cytology; fine needle aspiration; Nigeria.

Key messages: *The utilisation and practice of cytology as a sub-specialty of pathology is still in its fledgling phase in Nigeria. Increased awareness of its usefulness amongst clinicians, institutional will to establish dedicated cytology clinics and cytopathology training will engender a key transformative paradigm shift in the practice of cytology in Nigeria.*

1. INTRODUCTION

Cytology is a simple investigative technique for direct visualisation of morphological changes in cells at high magnifications. The accuracy, sensitivity and specificity of this technique is established in medical literature [1]. Cytology also has the peculiar advantages of minimal invasiveness, low cost and speed [2]. The specimen consist of exfoliated or passively exfoliated cells, fine needle aspiration smears and lesion imprints [1,3].

The first full-length publication on the use of cytology in Nigeria was written by Bhursnamath et al in 1986 and since then many institutions have adopted it as a component of pathology practice [4,5]. However, cytology practice has been restricted mainly to the tertiary institutions [2].

This present study aimed to explore the scope of employment of cytology in the management of patients in our institution based on the pattern of the requests and samples received in the pathology laboratory.

2. MATERIALS AND METHODS

This is a retrospective study and the materials consisted of the archival records and slides of the cytology specimens obtained in the histopathology laboratory of the Benue State University Teaching Hospital, Markurdi, Nigeria, from January 2013 to December 2015 inclusive. The hospital has a 350 – bed capacity and serves the communities around Makurdi, including referrals from distant parts of the north – central region of Nigeria. The records and glass slides of cytology specimens reported during the study period were retrieved and

analysed. In some instances, faded glass slides were re-stained, evaluated and re-classified using current classification schemes. Cervical cytology specimen samples were collected from the uterine cervix of female patients using Rovers Cervix brush (Rovers Medical Devices B.V., Netherlands), preserved in Specimen Preservative (LGM International Inc, Melbourne, USA), subjected to liquid based processing and the smears obtained were stained using the standard Papanicolaou staining procedure. Fine needle aspiration was performed by passing a small bore needle (21G or 22G) into a swelling or site of the lesion and tissue fluid containing cells were drawn in the hub of the needle using negative pressure created by using a 5ml or 10 ml syringe. A smear was made on a clean glass slide from the aspirate and immediately fixed in 95% ethanol. The fine needle aspirates, fluids obtained from body cavities and exfoliated cell sample smears were stained with Papanicolau or hematoxylin and eosin stains routinely.

Only specimens that met standard adequacy criteria for cytology were included. Such criteria included adequate cellularity; and blood cells, dirt or inflammatory cells not significantly obscuring epithelial cells. All those with incomplete or defective records and those in which a diagnosis could not be rendered because of technical defects, poor quality or evaluation errors, were excluded from the analysis. The local research ethics committee of the institution granted ethical clearance for this work. In addition, the data were analyzed with the Microsoft Excel 2007 edition statistical package.

3. RESULTS

Cytology samples consisted of 775 (27.5%) out of a total 2,823 specimens accessioned during

the three years period giving a histology-to-cytology ratio of 2.6:1. Table 1 shows the temporal trends of both cytology and tissue histology specimens during the study period. The overall cytology requests declined as opposed to a rise in histology (Table 1) during this time. A drop of 47.3% in the cytology samples followed an initial 35.6% increase from 273 to a peak of 299 samples. The nature of specimen and organ site distribution of the cytology specimens show that most of the samples were cervical smears constituting 56.3% and with an annual rate of 218 samples per year. There were 291 (37.5%) fine needle aspiration (FNA) biopsies with a rate of 97 cases per year, and 48 (6.2%) exfoliative cytology specimens (pleural fluid, urine, sputum, etc) with a case rate of 16 per year. Further analysis showed 134 (17.3%), 48 (6.2%), 40 (5.2%) and 37 (4.8%) breast, lymph node, soft tissue and thyroid FNAs respectively (Table 2).

4. DISCUSSION

A total number of 2,823 samples in the three years period attest to the fledgling phase of growth of pathology service in this region. The cytology specimens made up less than one third (775, 27.5%) while histology constituted the bulk (2048, 72.5%). Repeated industrial strike action by health care workers with attendant interruptions of clinical services and some other local factors are some of the reasons probably responsible for the 47.3% drop in the cytology samples observed during the period under review.

Cervical smear samples for screening of uterine cervix cancer screening constituted the bulk (56.3%, 436) of the samples received. Utoo et al (2013) surveyed 172 women in Makurdi and found that only seven percent (12) has had cervical cancer screening [6]. Thus, even though cervical smear constituted the bulk of the specimens, the awareness and utilisation of this diagnostic modality is still below expectations. The "Pap" uterine cervix cancer-screening test is simple to perform and does not require elaborate equipment. A spatula or brush is used to scrape cells off the surface of the uterine cervix, a smear is made on a glass slide, and stained with the Papanicolaou stain [7]. The reasons adduced for the very low utilisation of the Pap test include ignorance, absence of screening centres and physicians' non-recommendation [8]. Cytologic screening programs have led to a large decline in cervical cancer incidence and mortality in developed countries [9]. However, the scourge of this malignancy remains largely high in sub-

Sahara Africa communities because of ineffective or absent screening [10]. The literature is fraught with several papers written on this subject [6,8,11].

The rate of 97 fine needle aspiration biopsies per year we observed in this analysis is much below the average 307 FNA per year in most institutions reported by Malami (2008) in a nationwide survey of FNA practice in Nigeria [12]. Fine needle aspiration (FNA) of palpable breast lesions is one of the components of the "triple" test; the other components consisting of palpation and mammography. In our study, fine needle aspiration (FNA) biopsy of the breast was the second commonly requested cytology test, constituting 17.3% (134) and an annual rate of 67 cases per year (Table 2). This is comparable to the 78.5 breast FNAs per year reported by Mohammed et al (2005) in Kano [13]. In Kano, the rate of utilisation of FNA services in patient management steadily grew over the years. Less than ten years later, another author, Yusuf et al (2015), observed a 196% increase to 232.4 FNAs per year [14]. This figure is over 245% higher than our present findings in Makurdi. Kachewar (2015) recorded an annual rate of 112.5 FNA cases in a rural general hospital in India, a figure almost twice what we obtained in this study [15]. The higher rate of cytology requests in Kano and other places is probably because of increased awareness among surgeons and other clinicians, of the diagnostic usefulness of fine needle aspiration as a quick, cheap, less traumatic and accurate technique. The literature shows that the use of fine needle aspiration to investigate palpable breast lesions has proved over time to be profound with overall sensitivity ranging from 80 – 100% and specificity of over 90%. On this basis, unnecessary surgical procedures, sometimes, may be avoided when cytology is quickly employed to confirm clinically suspected cancers [16]. Quite often, the surgeon has to decide whether to request for fine needle aspiration or perform a needle core biopsy. On the side of the pathologist, a high frequency of grey zone diagnosis such as "atypical" or "indeterminate" undermines the usefulness of this test. Correlation of fine needle aspiration with follow-up tissue histology is expected to improve experience of the pathologist, confidence of the surgeons on the cytology reports delivered and judicious selection of the tests to request [2].

Fine needle aspiration of lymph nodes has also been found useful in ascertaining the cause of lymph node enlargements [17,18,19]. Aspiration

Table 1. Comparison of total cytology and histology specimen samples accessioned during the years of review (N=2823)

Specimen Type	2013	2014	2015	Totals	Percentage (%)
Cytology	273(36.4%)	299(29.1%)	203(19.4%)	775(27.5%)	27.5
Histology	477(63.6%)	728(70.9%)	843(80.6%)	2048(72.5%)	72.5
Totals	750	1027	1046	2823	100

Table 2. Annual distribution of organ site of lesion and annual rate (N=775)

Organ site	2013	2014	2015	Total	Percentage (%)	Annual rate
Uterine cervix	108	186	142	436	56.3	218.0
Breast	83	37	14	134	17.3	67.0
Lymph nodes	15	22	11	48	6.2	24.0
Soft tissue	19	13	8	40	5.2	20.0
Thyroid	19	11	7	37	4.8	18.5
Pleural fluid	8	14	9	31	4.0	15.5
Salivary glands	9	7	2	18	2.3	9.0
Abdominal mass	6	0	0	6	0.8	3.0
Sputum	3	1	1	5	0.6	2.5
Peritoneal fluid	0	1	3	4	0.5	2.0
Urine	0	0	4	4	0.5	2.0
Buccal smear	0	3	0	3	0.4	1.5
Nose	0	1	2	3	0.4	1.5
Eye	0	2	0	2	0.3	1.0
Testes	2	0	0	2	0.3	1.0
CSF	0	1	0	1	0.1	0.5
Liver	1	0	0	1	0.1	0.5
Totals	273	299	203	775	100.0	387.5

of lymph nodes ranked third in this study with an annual rate of 24 FNAs per year (Table 2). We consider this dismally low when compared to what obtains in other places. In India, Rao et al. [19] obtained 132 lymph node FNAs in about 21 months, giving an annual rate of about 75.4 FNAs per year. FNA is has also been found to be especially useful for quickly investigating other superficial swellings due to conditions such as Burkitt lymphoma and rhabdomyosarcoma in children [20,21].

The thyroid gland is one of the most easily accessible superficial organs. This study recorded 18.5 thyroid FNAs per year (Table 2). This is very low when compared to 163.5 and 63.5 thyroid FNA cases per year in Islamabad and Karachi respectively, both in Pakistan [22,23]; and 194 cases per year in India [24].

Pleural effusions, ascitic fluid, and urine consisted of 4%, 0.5% and 0.5% respectively, of the specimens received. Cytological observations of cells exfoliated in urine grants a reliable diagnostic modality for primary diagnosis and follow-up of patients with neoplastic lesions

of the urinary tract [25,26]. There were three buccal smear cytology requests as part of the investigations of sex differentiation anomalies.

Cytology is cheap and highly recommended in resource deficient climes such as obtains in most of sub-Saharan Africa. In Nigeria, the cost of fine needle aspiration biopsy is much less than that of an open or needle core biopsy although variations exist across institutions [27,28]. The procedure is simple and requires no sophisticated equipment except where image guidance is required. The only instrument peculiar to FNA biopsy procedure, for instance, is probably the syringe holder or gun. And although this may enhance the physical convenience of the operator, the use of this instrument has not even been shown to contribute significantly to the yield or accuracy of results [29].

The practice of cytology as a sub-specialty of pathology is still in its early developmental stage in Nigeria. Increasing awareness of its usefulness amongst clinicians, an institutional will to establish dedicated cytology clinics, a structured cytopathology training and increasing

experience by pathologists are factors which will engender a key transformative paradigm shift in the practice of cytology in Nigeria [21].

5. CONCLUSION

In the north – central region of Nigeria, cytology is still grossly under-utilized as a diagnostic tool in the management of patients. Although mostly employed in routine cervical cancer screening, other patients need to benefit more from this simple, minimally invasive, cheap, highly sensitive and accurate investigative modality.

CONSENT

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Bibbo M, Wilbur DC, editors. Comprehensive cytopathology. 3rd ed. Philadelphia, USA: Saunder Elsevier; 2008.
2. Malami SA, Ochicha O. A review of the utilization of fine needle aspiration in clinical practice and research in Nigeria. *Cytojournal*. 2011;8:12.
3. Orell SR, Sterrett GF. Fine needle aspiration cytology. 5th ed. New Delhi: Elsevier. 2012;2.
4. Bhursnamath SR, Afolayan EA, Bhursnamath B. Fine needle aspiration biopsy cytology (FNAB) in diagnosis of tumours. *West Afr J Med*. 1986;5:41-7.
5. Ogunniyi JO, Senbanjo RO, Ogunlusi ML. Fine needle aspiration cytology in the assessment of breast lumps in Ibadan. *Afr J Med Sci*. 1989;18:151-4.
6. Utoo BT, Ngwan SD, Anzaku AS. Utilization of creening services for cancer of the cervix in Makurdi, Nigeria. *J Reprod Biol Health*. 2013;1:2. Available:<http://dx.doi.org/10.7243/2054-0841-1-2>
7. Cibas ES, Ducatman BS, editors. Cytology: Principles and clinical correlates. 3rd edition. Philadelphia: Saunder Elsevier. 2009;1.
8. Kikelomo A, Rakiya S, Abiodun A, Adegboyega F, Adebunmi O, Kazeem I. Factors contributing to low uptake of cervical screening in a population at risk. *Trop J Obstet Gynaecol* 2009;26:35-41.
9. Collaco LM, Zardo L. Cytologic screening programs. In: Bibbo M, Wilbur DC. Comprehensive cytopathology. 3rd ed. Philadelphia: Saunders Elsevier. 2008;47-55.
10. Sankaranarayanan R, Budukh AM, Rajkumar R. Effective screening programmes for cervical cancer in low- and middle-income developing countries. *Bull World Health Organ*. 2001;79(suppl):954- 962.
11. Nnadi DC, Nwobodo E, Ekele BA, Sahabi SM. Screening for cervical cancer: a review of outcomes among infertile women in a tertiary hospital in north-west Nigeria. *Ann Med Health Sci Re*. 2014;4930:383-387.
12. Malami SA, Iliyasu Y. Fine needle aspiration cytology in Nigeria. *Acta Cytol* 2008;52(4):400-3.
13. Mohammed AZ, Edino ST, Ochichia S, Alhassan SU. Value of fine needle aspiration biopsy in preoperative diagnosis of palpable breast lumps in resource-poor countries: a nigerian experience. *Annals of African Medicine*. 2005;4(1):19–22.
14. Yusuf I, Atanda AT. Validity of fine needle aspiration cytology of the palpable breast lesions: A teaching hospital experience. *Niger J Basic Clin Sci*. 2014;11:36-40.
15. Kachewar SS, Dongre SD. Role of triple tests core in the evaluation of palpable breast lumpIndian. *J Med Paediatr Oncol*. 2015;36(2):123–127. DOI: 10.4103/0971-5851.158846
16. Cangiarella J, Simsir A. Breast. Chap 7. In: Orell SR, Sterrett GF. Fine needle aspiration cytology. 5th ed. New Delhi, India: Elsevier. 2012;156-209.
17. Akinde OR, Abudu EK, Anunobi CC, Daramola AO, Banjo AA, Abdulkareem FB, Osunkalu VO. Accuracy of fine needle aspiration in the diagnosis of peripheral lymph node enlargements. Lagos University Teaching Hospital, Nigeria. *Nig Q J Hosp Med*. 2011;21(1):59-63.
18. Alam K, Maheshwari V, Haider N, Siddiqui F, Jain A, Khan A. Fine needle aspiration cytology (FNAC), a handy tool for metastatic lymphadenopathy. *The Internet Journal of Pathology*. 2009;10(2):1-7.
19. Rao VT, Mohan CN, Vamshidhar A. Utility of fine needle aspiration cytology in lymph

- node lesions with histopathological correlation. J Sci. 2015;5(8):634-636.
20. Thomas J, Adeyi AO, Olu-Eddo O, Nwachokor N. Fine needle aspiration cytology in the management of childhood palpable masses: Ibadan experience. J Trop Pediatr. 1999;45:378.
 21. Malami SA, Jiya NM, Ojo BA. The value of aspiration biopsy in the diagnosis of Burkitt's lymphoma. Experience in Sokoto northwestern Nigeria. In: Proceedings of the International Network for Cancer Training and Research Annual Meeting, Cairo, Egypt. INCTR. 2004;15-6.
 22. Mamoon N, Jamy R, Khan AH. Evaluation of fine needle aspiration cytology as a screening tool in thyroid lesions. J Pak Med Assoc 2013;63(9):1120-23.
 23. Baloch MN, Ali S, Ansari MA and Maher M. Contribution of fine needle aspiration cytology (FNAC) in the diagnosis of malignant thyroid nodules. Pakistan J Surg. 2008;24(1):19-21.
 24. Patel MM, Patel K, Kaptan KR, Sonal L, Italiya SL, Saini G. Fine needle aspiration cytology as a first line investigation in thyroid lesions. Nat J of Med Res 2013; 3(2):106-110.
 25. Park CH, Britsch C, Uson AC, Veenema RJ. Reliability of positive exfoliative cytologic study of the urine tract malignancy. J Urol. 1969;102:91-92.
 26. Layfield LJ, Elsheikh TM, Fili A, et al. Review of the state of the art and recommendations of the Papanicolaou Society of Cytopathology for urinary cytology procedures and reporting: The papanicolaou society of cytopathology practice guidelines task force. Diagn Cytopathol. 2004;30(1):24-30.
 27. Madubogwu CI, Ukah CO, Onyiaorah IV, Anyiam DCD, Anyanwu SNC, Chianakwana GU. Cost effectiveness of fine needle aspiration cytology for breast masses. Orient J Med. 2015;27(1,2):22-27.
 28. Thomas JO, Amanguno HU, Adeyi OA, Adesina AO. Fine needle aspiration (FNA) in the management of palpable masses in Ibadan: Impact on the cost of care. Cytopathol. 1999;10:206-10.
 29. Mayun AA, Nggada HA, Abdulazeez OJ, Musa AB, Pindiga UH, Khalil MIA. Pistol grip holder (Cameco syringe pistol) in fine needle aspiration: Any advantage over the use of direct finger grip? Nig Postgrad Med J. 2013;20(2):116-119.

© 2016 Vhritherhire et al.; This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Peer-review history:

*The peer review history for this paper can be accessed here:
<http://sciencedomain.org/review-history/17011>*